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(54) Title: UNIVERSAL BINDING FILM

(54) Bezeichnung: UNIVERSALBINDEFILM

(57) Abstract

A binding matrix contains a substrate upon which are adsorbed by means of anchoring groups solid phase reactants capable of binding at least one free reaction partner. The solid-phase reactant forms a diluted and essentially laterally homogeneous binding layer on the surface of the substrate. In addition, according to an assaying process for an analyte in an assay solution, a solid-phase reactant that forms a component of the disclosed binding matrix is used. The specific binding reaction is preferably determined by optical reflection techniques.

(57) Zusammenfassung

Die Erfindung betrifft eine Bindematrix, enthaltend ein Trägermaterial und einen daran über Ankergruppen adsorbierten Festphasen-Reaktanden, der mit mindestens einem freien Reaktionspartner bindefähig ist, worin der Festphasen-Reaktand eine verdünnte und im wesentlichen lateral homogene Bindeschicht auf der Oberfläche des Trägermaterials bildet. Weiterhin wird ein Verfahren zur Bestimmung eines Analyten in einer Probelösung beansprucht, worin man einen Festphasen-Reaktanden verwendet, der Bestandteil einer erfindungsgemäßen Bindematrix ist. Dabei wird die spezifische Bindungsreaktion vorzugsweise durch reflexionsoptische Techniken bestimmt.

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Claims

1. A binding matrix containing a carrier material coupled to a solid-phase reactant via anchoring groups which can couple with at least one reaction partner, wherein the solid-phase reactant forms a dissolved and basically laterally homogenous binding layer on the surface of the carrier material.

2. Binding matrix according to Claim 1, wherein the occupation of the solid-phase reactant on the surface of the carrier material ranges from 0.1% to 90% of the maximal occupation.

3. Binding matrix according to Claim 2, wherein the occupation of the solid-phase reactant on the surface of the carrier material ranges from 0.5% to 70% of the maximal occupation.

4. Binding matrix according to Claim 3, wherein the occupation of the solid-phase reactant on the surface of the carrier material ranges from 1% to 40% of the maximal occupation.

5. Binding matrix according to Claims 1 through 4, wherein the carrier material employs a metal-, metal oxide-, or glass-surface.

6. Binding matrix according to Claim 5, wherein the carrier material employs a gold-, silver-, or palladium-surface and wherein the anchor group is a thiol-, disulfide-, or a phosphine-group.

7. Binding matrix according to Claims 1 through 6, wherein the anchor group is coupled to the solid-phase reactant via a flexible spacer molecule.

8. Binding matrix according to Claim 6, wherein the flexible spacer molecule contains at least one alkyl group with the formula $(CH)_n$ where n equals an integer number between 1 and 30.

9. Binding matrix according to Claims 7 or 8, wherein the spacer molecule is coupled to two or more solid phase reactants.

10. Binding matrix according to Claim 9, wherein the spacer molecule is a cystamin.

11. Binding matrix according to Claims 7 or 8, wherein a hydrophilic linker group is inserted between the spacer molecule and the solid phase reactant.

12. Binding matrix according to Claim 11, wherein the hydrophilic linker group contains one or more oxyethylene groups.

13. Binding matrix according to Claim 12, wherein the hydrophilic linker group consists of an amine or hydroxyl-terminated polyethylene oxide.

14. Binding matrix according to Claim 13, wherein the hydrophilic linker group consists of a 1,8-diamino-3,6-dioxaoctane.

15. Binding matrix according to Claim 12, wherein besides the spacer molecules coupled to the solid-phase reactant other spacer molecules are present which contain anchoring groups that are not coupled to the solid phase reactant.

16. Binding matrix according to any of the previous Claims, wherein the solid phase reactant is an antigen or hapten able to bind to an antibody.

17. Binding matrix according to Claims 1 trough 15, wherein the solid phase reactant is biotin.

18. Binding matrix according to Claims 7 or 8, wherein the solid phase reactant consists of an inner and an outer component where the outer component is capable of binding at least one free reaction partner.

19. Binding matrix according to Claim 18, wherein the inner component of the solid phase reactant constitutes a non diluted layer on the surface of the carrier material and wherein the outer component is coupled to the inner component by affinity coupling.

20. Binding matrix according to Claim 19, wherein the inner component is biotin and the outer component is streptavidin.

21. A method to determine an analyte in a test sample solution via a specific binding reaction between at least two bioaffinity reactants one of which is coupled to the solid-phase and where the other reaction partners are free, wherein a solid-phase reactant is used which is part of a binding matrix according to any one of Claims 1 through 20.

22. A method according to Claim 21, wherein the specific binding reaction is determined optically, electronically, through the heat radiation, or the molecular masses.

23. A method according to Claim 21, wherein the specific binding reaction is determined by reflection-optical techniques.

24. A method according to Claim 23, wherein the specific binding reaction is determined by plasmon-spectroscopy.

25. A method according to Claim 21, wherein the specific binding reaction is determined potentiometrically or amperometrically.

26. A method according to Claim 23, wherein the specific binding reaction is determined through the electrical conductivity or change in capacitance.

27. A method to construct a binding matrix according to any of the Claim 1 through 20, wherein the carrier material is incubated with a reaction solution containing molecules which from a binding layer adsorbed to the carrier material.